

World Trade Center Project



The Attack



- Two 110 story towers
- Four subway lines
- Six basement levels
- 24,000 gallons of jet fuel
- Fires burned at 1400°F for over 3 months
- 2 billion pounds of rubble
- Existing DNA tools incapable of handling this magnitude

The Victims



- Unknown number of casualties early on
- Some family members afraid to come forward
- 20,000 total remains
- Mostly bone samples
- Some victims found in up to 200 fragments
- Vast majority of remains required DNA analysis
- ~2,750 total victims

The Recovery



Thousands of rescue workers work around the clock from 9/11/01 through 5/30/02 in the recovery effort.

Because more people were killed on the ground than in the air, NY State keeps jurisdiction.



Staten Island Triage



Trucks ship tons of debris from Ground Zero to the Staten Island Recovery Site



Forensic anthropologists examine the debris to determine if it contains human remains



Human remains found are sent to the Forensic Investigation Center in Albany, NY

Staten Island Recovery Site





Victim samples are typed using many DNA fingerprinting techniques, such as STR, MitoDNA & SNP to match against a personal effect.



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Family members are cheek-swabbed for their DNA so that Kinship identification can be made when direct matching is not available.

World Trade Center: Timeline

- **September 17:** Armed Forces DNA Identification Lab [AFDIL] asks Gene Codes to update *Sequencher*[™] for the Pentagon and Shanksville crashes.
- **September 28:** Office of the Chief Medical Examiner [OCME] in New York City contacts us for new software.
- **October 15:** Using the *Extreme Programming* [XP] methodology, software development is underway.
- **December 13:** *M-FISys* (Mass-Fatality Identification System) has its first release to the OCME.
- **Since:** Weekly/Biweekly releases personally delivered to the OCME, to accommodate rapidly changing requirements.

World Trade Center: Project

- Kent Beck brought in to teach us XP
- Consultant Bill Wake stayed on as XP Coach
- Used Visual C# client / Microsoft SQL Server
- Used NUnit framework for Unit Tests
- Isolated network for forensic data (legal requirement)
- Test-First philosophy throughout project
- QA specifies Acceptance Tests (Test Director)
- Pair-swapped every hour or two (check-in often)
- Single integration machine (Perforce source control)
- Weekly iterations for the first year (*Lots of Overtime*)

WTC: Programming Pit #1



WTC: Programming Pit #2



WTC: Paired Programming



WTC: Paired Programming



WTC: Paired Programming



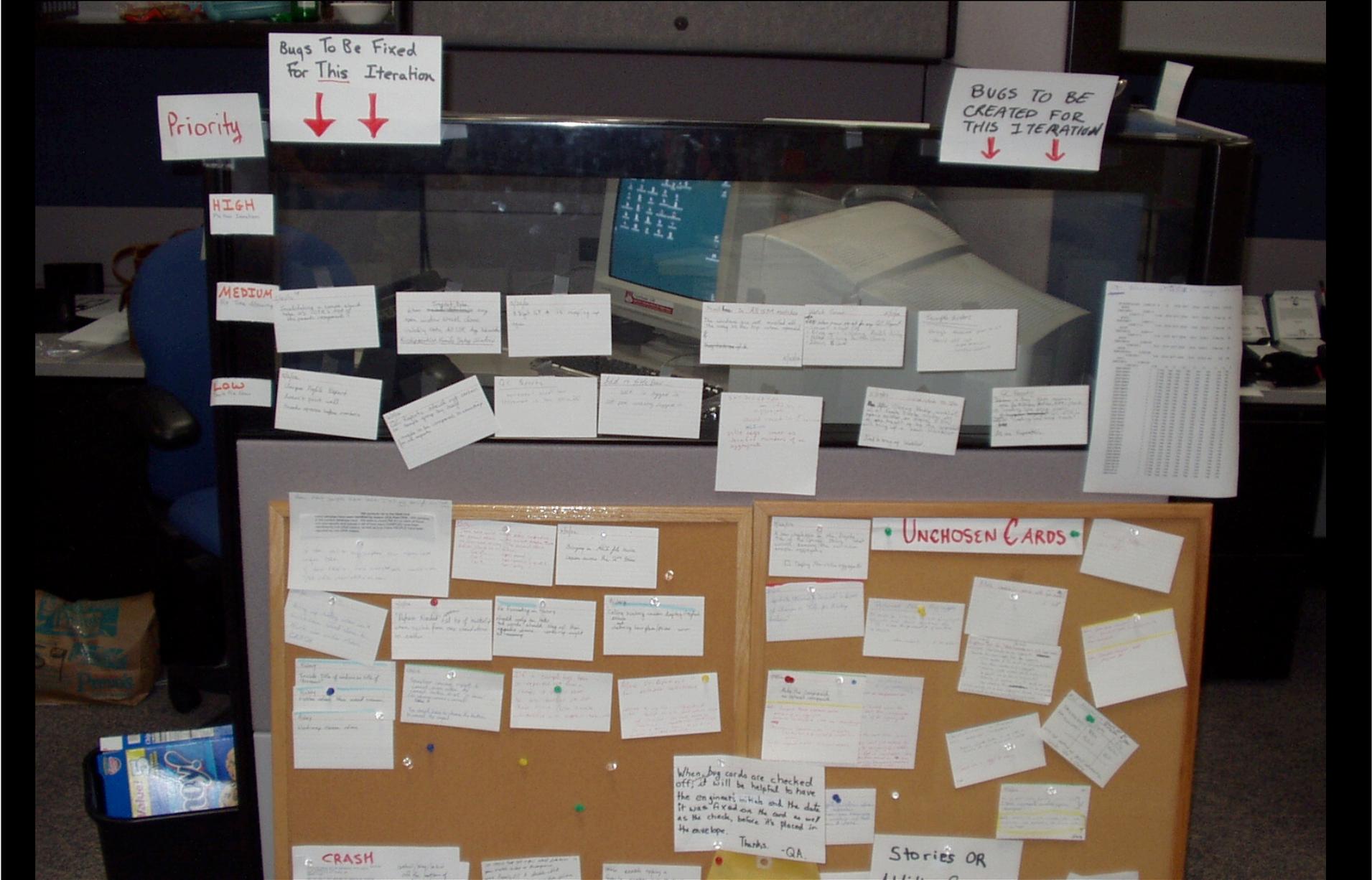
WTC: Standup Meetings



WTC: Dynamic Documentation



WTC: Story & Bug Cards



Priority

Bugs To Be Fixed For This Iteration
↓ ↓

BUGS TO BE CREATED FOR THIS ITERATION
↓ ↓

HIGH

MEDIUM

LOW

UNCHOSEN CARDS

When bug cards are checked off, it will be helpful to have the engineer's initials and the date it was fixed on the card as well as the check, before it's placed in the envelope.
Thanks -QA-

CRASH

Stories OR

WTC: Tasking Meetings



WTC: Tasking Meetings

ITERATION 55

Ⓢ Tabbed Open in New Window (34)
 AT/RN/RA
 Collectors from how to Rebuild
 Fix Tests
 Ⓢ Event Aggregates srx get mta jobs
 Ⓢ Open in New Window

Ⓢ Tabbed Open in New Window (34)
 AT/RN/RA
 Master List Factory Method
 Implement For: STR, SNP, Mito, Jobs

Ⓢ Fix Importers (1/2)

AT/RN/RA
 Check Valid Sample Names
 Update Importers:
 License Plate
 CODIS
~~MII~~
 Mito
 Genotyper
 SNP
 CHF
 Kinsbip

Ⓢ Take Over For CODIS (0)

AT/RN/RA
 Take Away CODIS RMs
 Generate List

Freeze: FEB 13 2003 8 2 1 0

Plan: Flight: 2 13 DELIVER: FEB 14 2003

Make formatter tests independent of sample data
 Speed up tests
 Acceptance test class
 Sample aggregate test failures - line 754
 Make Ethal chain summaries like One Summary
 (Ethal (1/2))
 Ⓢ Verify merge criteria by default in tests
 Events only loader
 Extract storage from factory
 Ⓢ Importers load command from... also import
 Look at test setup
 Get correct identifier (#1 in #01)
 Ⓢ SNP or get for the db file
 Refactor pkg maps
 Move Speculation loading to static method

chain Locator
 Refactor Progress Bar
 Timing/Load/Performance Tests
 Move all messages to MessageLibrary
 RESTRUCTURE packages
 New NUNIT

Eclipse

Ⓢ Sample Aggregate how

QA Tasks

Fix SNP Sorting Test
 Create Test DB For Open in New Window
 Write Test For Open in New Window
 Write Test For Importers to Check Valid
 Sample IDs
 Get Details on HLA PE Cord
 Verify Removal of Duplicate Samples
 Verify Fix of Sample Names
 Fix SNP Files 1-3
 RN/CDS/INT
 Make Import File For Kis
 Create Test DB For FB Tab
 Write Test For FB Tab
 Test Import of New K Samples
 Access Rm/k marks & notes for Howard
 Test for SNP Conversions

Conclusions

- Agile works best with “small” team sizes
- There is no methodology “silver bullet”
- Don’t be religious; be practical
- You can adopt some practices without taking all
- A practice that will not be embraced by the team is not worth pushing down their throats
- Agile practices need an advocate to management
- Experimenting with practices must be done at the team level (individual level does not work)



Q & A